

App. Serial No. 10/539,102
Docket No.: NL031069US

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Remarks

Claims 1-12 are pending in the application. Reconsideration and allowance of the application are respectfully requested.

The non-final Office Action dated April 17, 2007 indicated an objection to the drawings, objections to the specification and listed the following rejections: claims 2-3 and 5-10 stand rejected under 35 U.S.C. § 112, second paragraph; claims 1, 2 and 4 stand rejected under 35 U.S.C. § 102(b) over Cohen (U.S. Patent No. 3,846,767); claim 3 stands rejected under 35 U.S.C. § 103(a) over Cohen; Claims 7-10 stand rejected under 35 U.S.C. § 103(a) over Cohen in view of Ovshinsky et al. (U.S. Patent No. 6,087,674); and claims 11-12 stand rejected under 35 U.S.C. § 103(a) over Cohen in view of Lowrey et al. (U.S. Patent No. 6,314,014).

Applicant respectfully traverses the objection to the drawings because the drawings should not be required to show such limitations. Notwithstanding, the drawings do show the limitations of claim 5 including that "the phase change material constitutes a conductive path between a first contact area and a second contact area, a cross-section of the conductive path being smaller than the first contact area and the second contact area." For example, Applicant's Figure 5 shows a cross-section of a conductive path in the layer 107 between the first contact area covered by mask 111 and a second contact area covered by mask 112, with the cross-section being smaller than the first contact area and the second contact area. See, e.g., Paragraph 0058 of Applicant's Specification. Thus, Applicant submits that the limitations of claim 5 are shown in the drawings. Accordingly, the objection to the drawings is improper and Applicant requests that it be removed.

Regarding the objection to paragraph 0048 of the Specification, Applicant has provided an amended copy of paragraph 0048 on page 2 of this paper that corrects the typographical error regarding the reference numerals. Thus, Applicant requests that the objection to paragraph 0048 of the Specification be removed.

Applicant respectfully traverses the objection to claim 5, because the limitations of claim 5 are fully supported by the Specification. Not only do the claims form part of the Specification, but the Detailed Description is also supportive. Applicant submits that, for example, paragraphs 0020 and 0058 of the Specification fully support the claimed

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limitations directed to "a cross-section of the conductive path being smaller than the first contact area and the second contact area." As such, the objection to claim 5 is improper and Applicant requests that it be removed.

Applicant respectfully traverses the Section 112(2) rejections of claims 2-3 and 5-10 because these claims do particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Regarding claim 2, Applicant submits that it would be clear to one of skill in the art that the "heating element electrical resistance" is referring to the electrical resistance of the heating element. The Office Action states that "(i)t is unclear whether the "heating element electrical resistance" is different than the normal electrical resistance of the heating element." *See*, the instant Office Action on page 4. Applicant notes that there is no "normal electrical resistance of the heating element" in the claims, as such, it is unclear as to what the Office Action is referring to as the "normal electrical resistance." Regardless, the limitations of claim 2 would be clear to one of skill in the art. Therefore, the Section 112(2) rejection of claim 2 is improper and Applicant requests that it be withdrawn.

Regarding claim 5, Applicant submits that it would be clear to one of skill in the art that the conductive path is located in the phase change material between the first and second contact areas, and that a cross-section of the conductive path is smaller than the first and second contact areas. The Office Action states that "It is unclear whether the conductive path is a volume or a line" and that "the claim seems to indicate that the conductive path is different than the volume of the phase change material." *See*, the instant Office Action on page 4. Applicant notes that there is no "volume" and no "line" in the claim 5, as such, the Office Action appears to be discussing terms that are not relevant to the claim. Regardless, claim 5 states that "the phase change material constitutes a conductive path between a first contact area and a second contact area" which indicates that the conductive path is located in the phase change material between the first contact area and the second contact area. Moreover, it would be clear to one of skill in the art that the cross-section of the conductive path has an area which is smaller than the first contact area and the second contact area. As such, the Section 112(2) rejection of claim 5 is improper and Applicant requests that it be withdrawn. Notwithstanding, in an effort to facilitate prosecution, Applicant has amended claim 5 to

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recite that the cross-section of the conductive path has an area. This amendment is not being made to overcome any issues relating to patentability or to overcome any rejections in the instant Office Action, which fail for the reasons discussed herein.

Regarding claim 7, Applicant submits that it would be clear to one of skill in the art that a composition $X_{100-(t+s)}Si_tY_s$, where t and s denote atomic percentages satisfying $t < 0.7$ and $s+t > 0.3$, means that t is less than 70 percent and that $s+t$ is greater than 30 percent. Accordingly, the Section 112(2) rejection of claim 7 is improper and Applicant requests that it be withdrawn. Notwithstanding, in an effort to facilitate prosecution, Applicant has amended claim 7 to clarify that 0.7 refers to 70 percent and that 0.3 refers to 30 percent. This amendment is not being made to overcome any issues relating to patentability or to overcome any rejections in the instant Office Action, which fail for the reasons discussed herein.

Applicant traverses the Section 102(b) rejection of the claims 1, 2 and 4 because the cited portions of the Cohen reference do not correspond to all of the claim limitations. Applicant notes that claim 1 has been amended to clarify that which would have been apparent to one of skill in the art, that the heating element heats the phase change material to enable the material to transition between phases. Regarding claim 1, the cited portions of Cohen do not correspond to claim limitations directed to a heating element that enables the phase change material to transition from the first phase to the second phase by heating the phase change material. The Office Action cites to memory semiconductor layer 6 and to filamentous path 6a as corresponding to the phase change material and the heater respectively of the claimed invention. However, the Cohen reference teaches that the filamentous path 6a is the part of the semiconductor layer 6 through which current flows, thereby enabling the path 6a to convert between an amorphous state and a crystalline state. *See, e.g.*, Figure 1, Col. 7:20-26 and Col. 8:8-12. The Cohen reference teaches that current flows through a phase change material (*i.e.*, filamentous path 6a) to convert the material between two phases, not that a separate heating element heats the phase change material to enable the material to transition between phases as in the claimed invention. Applicant submits that one of skill in the art would recognize that Cohen's filamentous path 6a, which is comprised of phase change material, does not correspond to the heating element of the claimed invention. Therefore,

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the Section 102(b) rejection of claim 1, and the rejection of claims 2 and 4 that depend from claim 1, is improper and Applicant requests that it be withdrawn.

Applicant traverses all of the Section 103(a) rejections, all of which are based upon the Cohen reference, because the cited portions of Cohen do not correspond to all of the claim limitations as discussed above in connection with the Section 102(b) rejection of claim 1. In at least this regard, the rejections of claims 3 and 7-12 that depend from claim 1 are improper, because the rejections rely upon the same (improper) interpretation of the Cohen reference. Accordingly, Applicant requests that all of the Section 103(a) rejections be withdrawn.

Applicant further traverses the Section 103(a) rejections of claims 3 and 7-10 because the Office Action fails to establish a *prima facie* case of obviousness. Regarding claim 3, the Office Action fails to address claim limitations directed to the heating element's electrical resistance. The Office Action acknowledges that the Cohen reference does not disclose that the heating element's electrical resistance is larger than 0.3 times the minimum of the first electrical resistance and the second electrical resistance. The Office Action then states that "(i)t would have been obvious as a matter of design choice to form the device so that the cross-section of the conductive path is smaller than the first and second contact areas." See, the instant Office Action, page 8:6-7. Applicant submits that this statement fails to address the claim limitations directed to the heating element's electrical resistance being larger than 0.3 times the minimum of the first electrical resistance and the second electrical resistance. Thus, the Office Action fails to cite prior art that corresponds to all of the claim limitations as required. Therefore, the Section 103(a) rejection of claim 3 is improper and Applicant requests that it be withdrawn.

Regarding claims 7-10, the Office Action bases the rejection of claims 7-10 on Cohen in view of Ovshinsky (U.S. Patent No. 6,087,674). However, the Office Action then states that "Nakamori teaches a heating element (heating resistors) where the composition satisfies $X_{100-(t+s)}Si_sY_t$ (TaSiC, column 5 lines 21-35, TaSiN, column 6 lines 28-35)." The Office Action does not identify what "Nakamori" is, and the corresponding portions of the Ovshinsky reference do not mention TaSiC or TaSiN. See, e.g., Col. 5:21-35 and Col. 6:28-35. As such, the Office Action fails to cite prior art that corresponds to all of

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the claim limitations as is required. Accordingly, the Section 103(a) rejection of claims 7-10 is improper and Applicant requests that it be withdrawn. Should this rejection be maintained, Applicant respectfully requests clarification regarding the basis for the rejection and an opportunity to respond thereto.

In view of the remarks above, Applicant believes that each of the rejections has been overcome and the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Peter Zawilski, of NXP Corporation at (408) 474-9063 (or the undersigned).

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